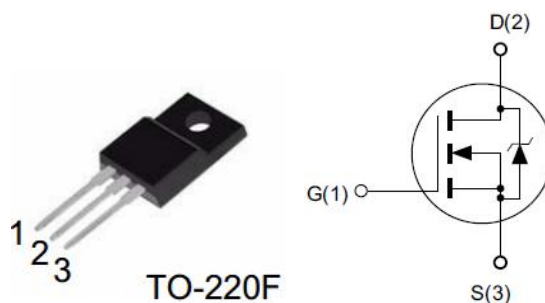


Features

- ◆ 600V, 12A, $R_{DS(ON)}(Typ.) = 0.55\Omega @ V_{GS} = 10V$.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ Adapter
- ◆ LCD Panel Power
- ◆ E-Bike Charger
- ◆ Switching Mode Power Supply



Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Limit	Unit
		TO-220F	
V_{DS}	Drain-Source Voltage ^a	600	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_c = 25^\circ\text{C}$	12	A
	Drain Current-Continuous, $T_c = 100^\circ\text{C}$	7.5	A
I_{DM}	Drain Current-Pulsed ^b	48	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ\text{C}$	42	W
EAS	Single Pulsed Avalanche Energy ^d	500	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	2.95	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max	62.5	$^\circ\text{C/W}$

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	-	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 6A$	-	0.55	0.75	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2055	-	pF
Coss	Output Capacitance		-	180	-	pF
Crss	Reverse Transfer Capacitance		-	7	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 300V, I_D = 12A,$ $R_G = 10\Omega, V_{GS} = 10V$	-	27	-	ns
t_r	Turn-On Rise Time		-	25	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	63	-	ns
t_f	Turn-Off Fall Time		-	39	-	ns
Qg	Total Gate Charge	$V_{DS} = 480V, I_D = 12A,$ $V_{GS} = 10V$	-	40	-	nC
Qgs	Gate-Source Charge		-	9.8	-	nC
Qgd	Gate-Drain Charge		-	14.5	-	nC

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_{GS} = 0V$	-	-	12	A
I_{SM}	Maximum Pulsed Current	$V_{GS} = 0V$	-	-	48	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 12A$	-	-	1.4	V
trr	Reverse Recovery Time	$I_S = 12A, V_{GS} = 0V$ $dI_F/dt = 100A/\mu s,$	-	576	-	ns
Qrr	Reverse Recovery Charge		-	3.98	-	μC

Notes:

- $T_J = -55^\circ C$ to $+150^\circ C$.
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- $L = 10mH, V_{DD} = 50V, I_{as} = 10A, R_g = 25\Omega$ Starting $T_J = 25^\circ C$.

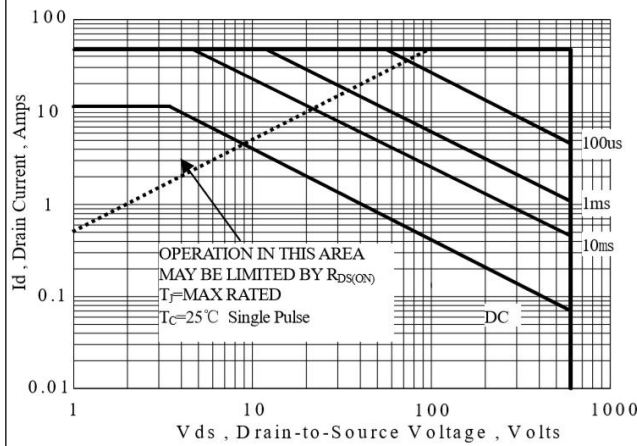


Figure 1. Maximum Safe Operating Area

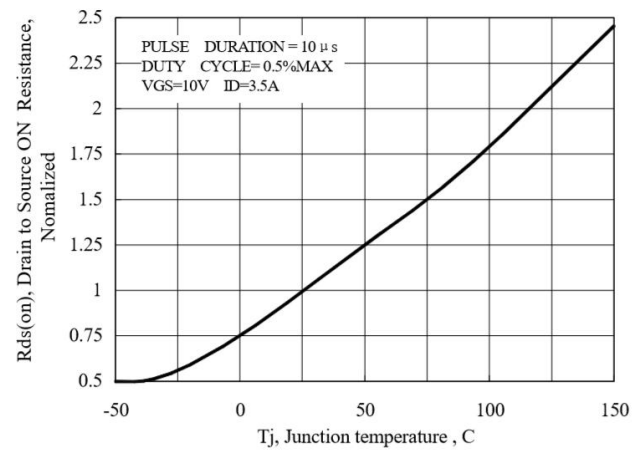


Figure 2. Normalized On-Resistance Variation with Temperature

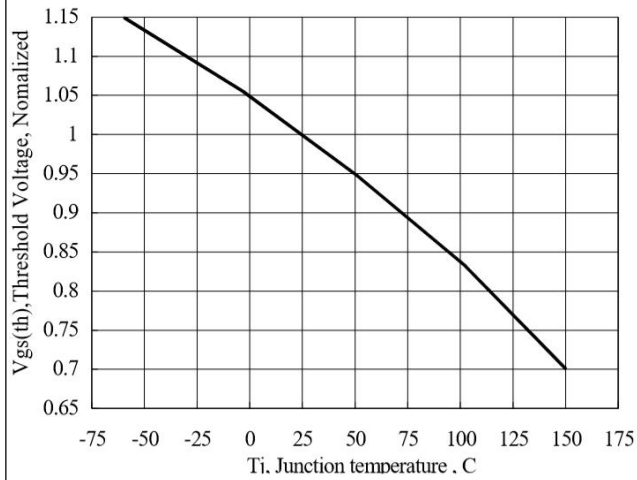


Figure 3. Typical Threshold Voltage vs Junction Temperature

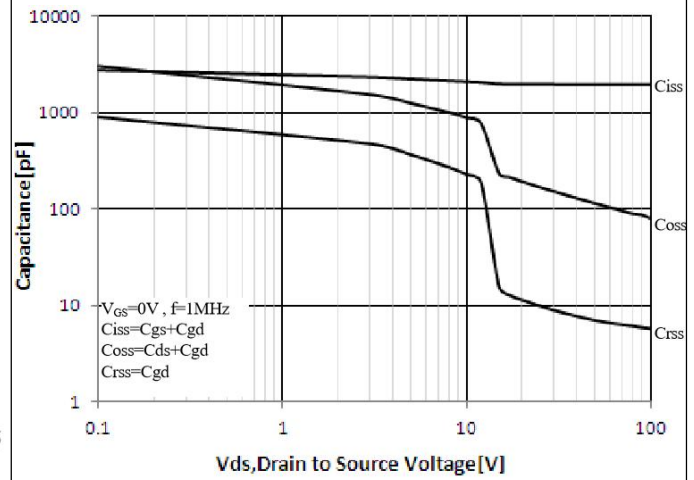


Figure 4. Capacitance Characteristics

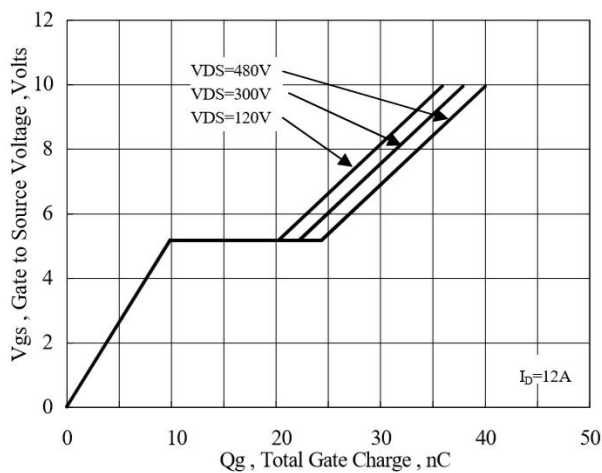


Figure 5. Gate Charge Characteristics

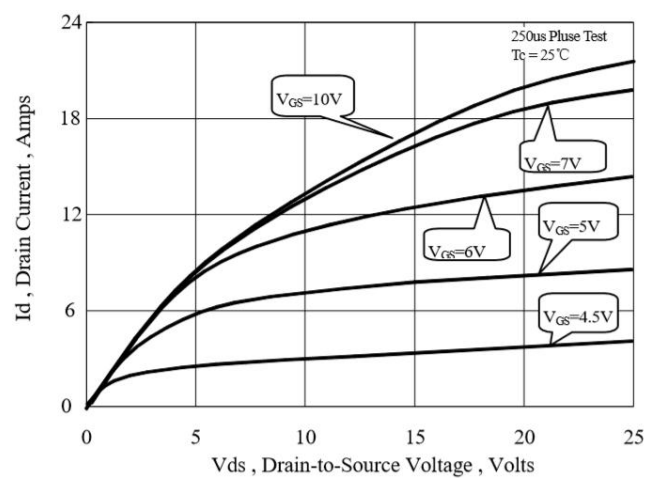


Figure 6. On-State Characteristics

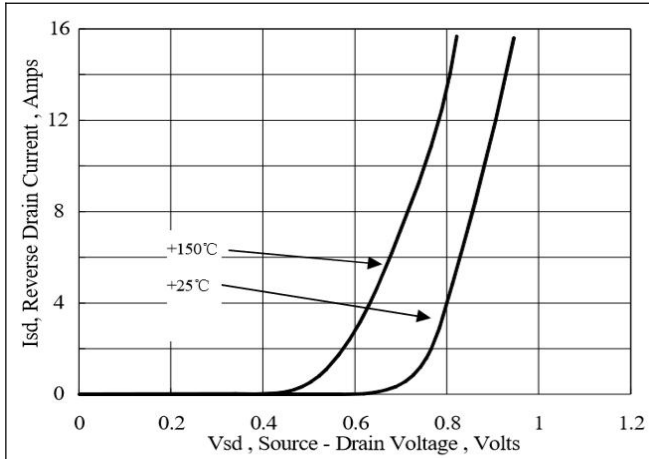


Figure 7. Body Diode Transfer Characteristics

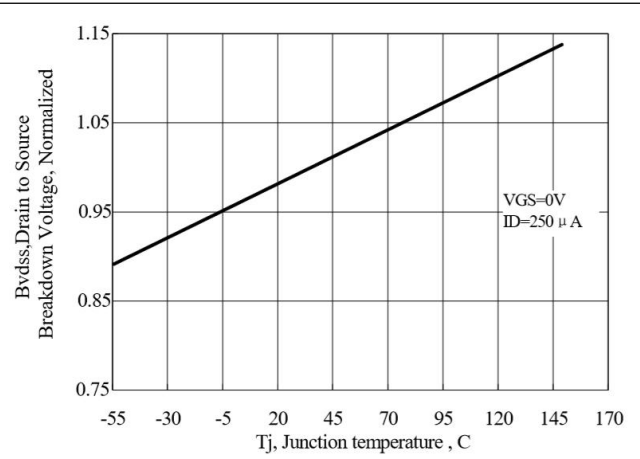


Figure 8. Typical Breakdown Voltage vs Junction Temperature

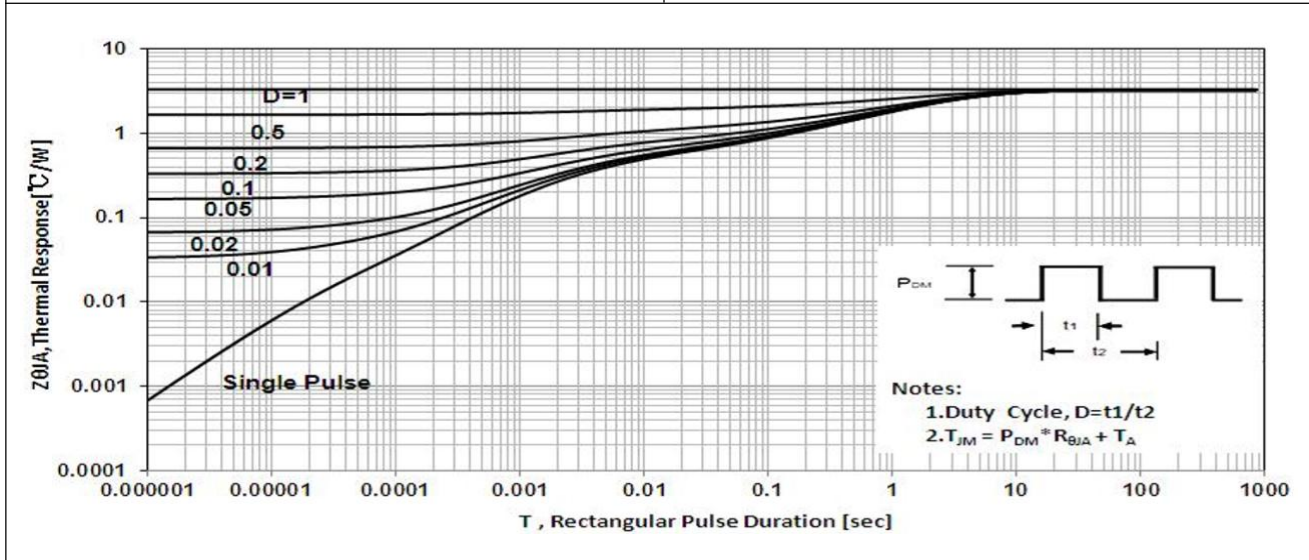


Figure 9. Normalized Effective Transient Thermal Impedance With Pulse Duration



Technical drawing of a mechanical part, showing three views: Top View, Front View, and Side View. Dimensions are given in millimeters (mm) with tolerances.

Top View:

- Overall width: 10.16 ± 0.2
- Overall height: 15.87 ± 0.2
- Central hole diameter: $\phi 3.18$
- Four corner holes diameter: $\phi 1.5 \times 0.1 \pm 0.05 \text{ DP}$
- Distance from top edge to center of corner holes: 1.20
- Distance from center of corner holes to center of central hole: 1.27 ± 0.05
- Distance from bottom edge to center of corner holes: 0.80
- Distance from left edge to center of corner holes: 2.54
- Distance from right edge to center of corner holes: 2.54

Front View:

- Overall width: 10.16 ± 0.2
- Overall height: 12.93 ± 0.2
- Distance from top edge to center of central hole: 1.20
- Distance from center of central hole to center of slot: 1.27 ± 0.05
- Distance from center of slot to center of corner holes: 0.80
- Distance from bottom edge to center of corner holes: 0.80
- Distance from left edge to center of corner holes: 2.54
- Distance from right edge to center of corner holes: 2.54

Side View:

- Overall width: 4.70 ± 0.05
- Overall height: 6.68 ± 0.2
- Distance from top edge to center of corner holes: 2.54
- Distance from center of corner holes to center of slot: 1.0
- Distance from center of slot to center of corner holes: 2.76 ± 0.03
- Distance from bottom edge to center of corner holes: 0.50